## Seventh Semester B.E. Degree Examination, December 2012
## Computer Integrated Manufacturing

Time: 3 hrs. Max. Marks:100

**Note:** *Answer FIVE full questions, selecting*
*at least TWO questions from each part.*

## PART – A

1  a. Define automation. Explain different types of automation. **(10 Marks)**
   b. Explain the mathematical models, while giving mathematical equation for each teams. **(10 Marks)**

2  a. Discuss with examples types of automated flow lines. Also list the objectives of automated flow line. **(10 Marks)**
   b. Sketch and explain the working of Rollez chain drive mechanism. **(05 Marks)**
   c. List and explain control functions used in an automated flow line. **(05 Marks)**

3  a. Explain with examples upper bound and lower bound approaches to analyze automated flow line without storage buffer. **(08 Marks)**
   b. Briefly explain partial automation in a flow line. **(04 Marks)**
   c. The following data applies to a 20 station in line transfer machine. $P = 0.01$, $T_c = 0.6$min, $T_\alpha = 9$min. Using upper bound approach compute,
      i) Ideal production rate
      ii) Frequency of line steps
      iii) Actual production rate
      iv) Line efficiency. **(08 Marks)**

4  a. Explain the following terms in line balancing:
      i) Minimum rational work element
      ii) Precedence diagram
      iii) Cycle time
      iv) Balance delay. **(08 Marks)**
   b. A new product is to be assembled in a plant, the data gives the precedence relationship and element times:

| Element | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Time 'Te' min | 1.0 | 0.5 | 0.8 | 0.3 | 1.2 | 0.2 | 0.5 | 1.5 |
| Immediate predecessor | - | - | 1, 2 | 2 | 3 | 3, 4 | 4 | 5, 6, 7 |

   Using largest candidate rule method,
      i) Construct the precedence diagram for this job.
      ii) If the ideal cycle time is to be 1.5min, what is the minimum number of work stations required?
      iii) Calculate the balance delay. **(12 Marks)**

## PART – B

5  a.  List the principles used in product design for automated assembly.  (04 Marks)
   b.  With neat figures explain elements of parts delivery system.  (08 Marks)
   c.  Define AGVS. Explain the functions and working of an AGVS.  (08 Marks)

6  a.  With block diagram, explain the two approaches used for designing CAPP systems.  
   (10 Marks)
   b.  What is material requirement planning? Explain the structure of a MRP system.  (10 Marks)

7  a.  Describe salient features of CNC systems along with a block diagram.  (10 Marks)
   b.  Discuss the advantages, disadvantages and applications of CNC machines.  (10 Marks)

8  a.  With neat figures explain the robot configurations.  (12 Marks)
   b.  Explain: i) Resolution; ii) Accuracy; iii) Repeatability as applied to robots.  (08 Marks)

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